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Progress on the Readout Electronics and Data Acquisition System for the NvDEx-100 Experiment

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The NvDEx-100 experiment is designed to search for neutrinoless double-beta (0νββ) decay using a high-pressure gaseous time projection chamber with SeF6 as the target medium. The detector features a front-end readout system comprising 8,192 sensors organized into 32 modular units within a single end-cap. These sensors perform ion collection and signal amplification, generating analog pulses that are continuously digitized by multi-channel ADCs. Each module incorporates a SerDes chip for data aggregation through oversampled SPI interfaces. The complete readout system employs 32 bidirectional 2.5 Gbps optical links connecting the front-end electronics to the DAQ system. Implemented via dual PCIe cards in a server configuration, the DAQ provides real-time control and continuous readout for all front-end modules. System validation has confirmed the full signal chain from sensor to event processing servers, including successful demonstration of direct ion tracking without avalanche amplification. This presentation will detail recent progress in sensor design and characterization, highlight outstanding technical challenges, and provide a comprehensive status report on the front-end electronics and DAQ system development.

Collaboration you are representing

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